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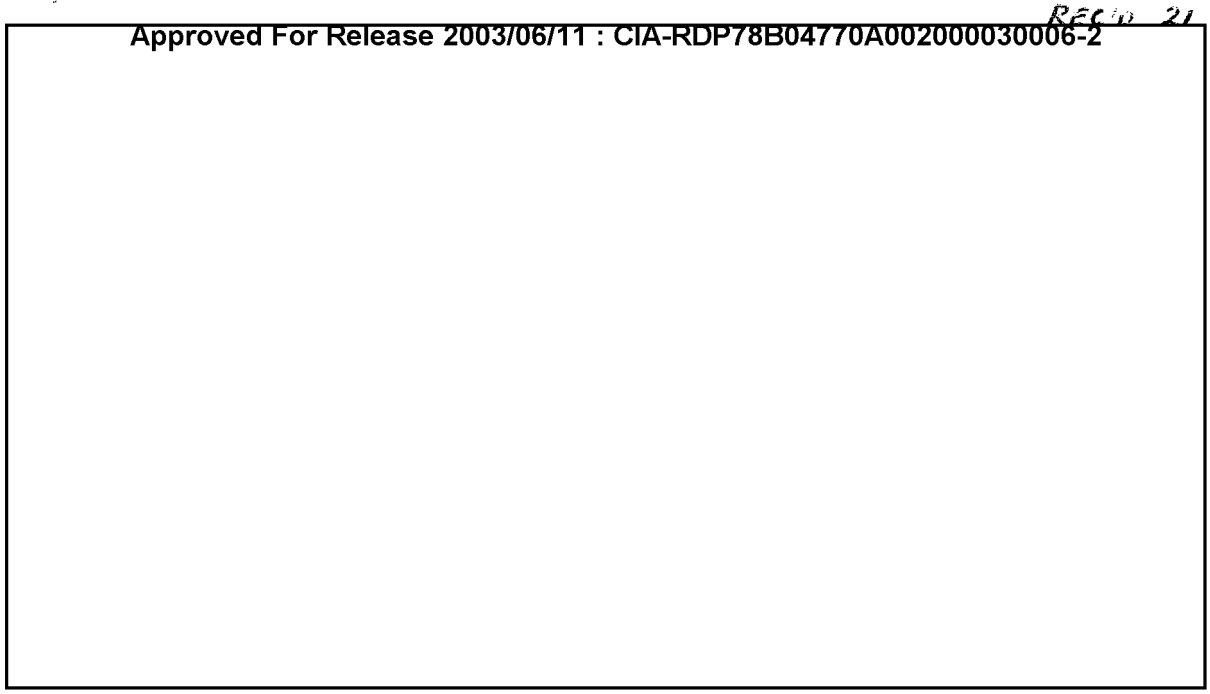
STAT



I am enclosing a brief preproposal outlining the three applications of the automatic focussing techniques that we discussed during your recent visit. Your comments and any additional information that you can supply will be appreciated.

In addition, I am enclosing a copy of two reports on our vision work that will be of interest to you.

We will be interested in hearing your comments and look forward to the opportunity to submit a formal proposal for work on the very challenging automatic focussing problems that you have outlined.

STAT

KWG:bjb

Enclosures

Declass Review by
NIMA/DOD

22 NOV 66

Paul:

This "pre-proposal" is of little value. As far as a follow on for automatic focusing with [redacted] I think that it should be limited to support of [redacted] rear projection viewer program. Time and funds are in too short supply to "diddle" around with marginal research projects.

STAT [redacted]

Jeff 29 Nov

1. Check with [redacted] about possible enlarger application.

2. Use your own judgment about the scanning microscope application.

(3) I believe we should establish feasibility for RPV application before considering incorporation.

STAT [redacted] STAT [redacted] STAT

[redacted] called on 15 Dec. 66 requesting [redacted] for #3 above both with + without GFE.

PREPROPOSAL FOR APPLICATION OF AUTOMATIC FOCUSSING TECHNIQUES

I INTRODUCTION

The focus detection technique developed at [redacted] STAT and described in the Final Report for [redacted] Project 5844 has potential STAT application to three different optical devices:

- rear-screen projection film viewers
- photographic enlargers
- stereo microscopes for detailed film viewing.

It is proposed that a working breadboard model of each of these three systems could be constructed using the same basic automatic focussing technique. Because of physical differences in the applications, the optical portions of each automatic focussing breadboard would have to be specifically tailored to the application. The electronic portion of the system, however, would probably be common to all three applications; therefore, only one such unit would have to be developed.

II DISCUSSION OF PROPOSED BREADBOARD UNITS

A. Rear-Screen Projection Film Viewer

Application of the automatic focussing technique to rear-screen projection viewers would require that a special image be projected onto the film surface from a position optically equivalent to the viewing screen. A reflected image of the pattern would then be used for focus detection. The output of the focus detection unit would drive a servo to control the position of the projector lens to maintain sharp focus.

A suggested block diagram for the breadboard system is shown in Fig. 1. A film guide mechanism, projector lens, and rear projection screen from an existing unit would be helpful for breadboard construction. The film transport and film plane guidance system would be studied for potential

modifications that would improve its compatibility with the automatic focussing unit for overall system functions.

As recommended in the Final Report, emphasis would be on maintaining sharp focus in the scanning mode at low magnifications (3X to 15X).

B. Photographic Enlarger

In the enlarger application, automatic focus would be used only for the critical final focus adjustment; coarse focus would be achieved by present manual or preset micrometer adjustments.

The same basic image projection technique described above can be used, with the image projector and detection unit built permanently into the enlarger baseboard. Each time the printing paper is changed, i.e., before each exposure, the focus will be readjusted automatically. Locating the image projector in the baseboard will present difficulties in introducing optical path variation through the use of the pellical mirror. However, possible alternatives, described in the referenced report, permit vibration of the image-generating mask to achieve the same effect.

The mask design and detection technique would be tailored for critical focus, rather than for wide excursion of defocus as required for the rear-screen film projection system. Present visual techniques are quite adequate for rough focus.

C. Stereo Microscope

Present microscope viewing of the 9 X 18 -inch film frame requires both critical placement of the film in an absolutely flat plane and a precise mechanism be which the microscope can be moved over the film plane. Because of the shallow depth of field of the microscope and the large area over which it must be capable of being moved, small deviations from critical focus of the objective position are believed to occur.

The camera port presently available on the microscope can be used for coupling of the automatic focussing technique. Precise placement of the film and a precision microscope mechanism will still be required; otherwise, deviations of the objection from critical focus could become so gross that the focus detection system would lose control.

III FURTHER INFORMATION

For each of the above applications for which further work is desired, STAT [redacted] would appreciate a brief description of pertinent equipment specifications and, if possible, a list of the components or complete pieces of equipment that might be supplied should project work be undertaken. Such knowledge would make possible a more detailed and specific formal proposal for research in each of the three application areas. Each application will be treated separately in the formal proposal to permit a final selection of any one or combination of applications for breadboard construction and evaluation.

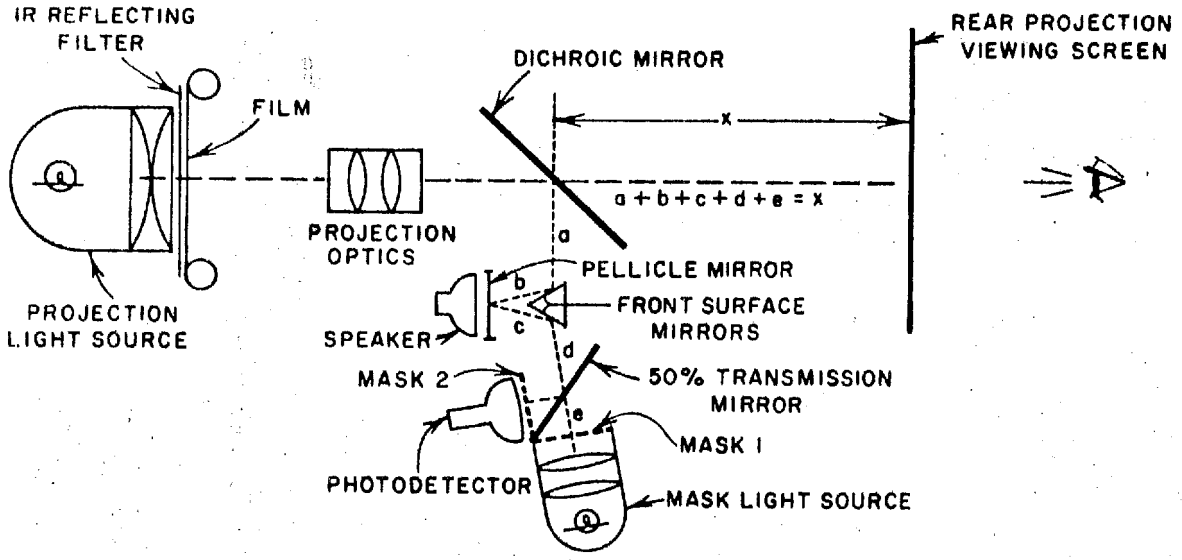


FIG. 1 EXPERIMENTAL SYSTEM FOR SIMULATING A REAR-PROJECTION VIEWER

STAT

[redacted]

January 18, 1967

STAT [redacted]

Dear Sir:

Enclosed is a copy of Proposal No. ESU 67-3 entitled "Construction of a Demonstration Automatic Focusing Rear-Screen Projector."

If you desire further information of a technical nature, please do not hesitate to contact [redacted] STAT Contractual matters should be directed to the attention of the undersigned. STAT

[redacted]

 20 JAN 67

STAT

[redacted]

January 11, 1967

STAT [redacted]

Dear Sir:

We are submitting herewith for your consideration three copies of Proposal No. ESU 67-3 entitled "Construction of a Demonstration Automatic Focusing Rear-Screen Projector."

If you desire further information of a technical nature, please do not hesitate to contact [redacted] STAT Contractual matters should be directed to the attention of the undersigned.

STAT [redacted]